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ABSTRACT

Background information to help K-12 teachers use objects found in the Smithsonian Institution or in other museums to stimulate students' creative thinking is provided. To encourage creative thinking, teachers must provide students with divergent problems, i.e., problems that are expansive, allow for a variety of responses, and have no fixed answers. Teachers must cultivate a classroom environment that encourages creativity. The understanding must be developed among students that there are times when free thinking is appropriate. The creative climate fosters an openness and respect for unusual questions and ideas, an understanding that all ideas have value, and an opportunity to learn and perform without constant threat of evaluation. Almost any museum object--from an ordinary light bulb to an African tribal mask--can be used in divergent activities. Slides and/or reproductions may serve as substitutes for the actual object. Divergent activities using museum objects can help students develop many kinds of thinking, including thinking that is fluent, flexible, original, and elaborative. (RM)

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TEACHING CREATIVE THINKING: A SMITHSONIAN APPROACH

by Alan Reid Gartenhaus

Designed by Stephen Kraft

Office of Elementary and Secondary Education
Smithsonian Institution
1984

" . . . presenting problems

. . . as opportunities"

Follow the Wild Geese

"Don't refuse an occasional wild goose chase. That's what wild geese are for." This anonymous quotation is used by Karl Albrecht in *Brain Power*. It highlights the way creative thinking, the ability to generate ideas and alternatives, often begins. The process moves from a fixed answer to a score of possibilities and, in so doing, extends our mental peripheral vision. Between *what is* and *what could be*, there are a vast number of personalized responses.

Classroom packets often present a body of facts about one topic, such as the Bill of Rights. But not this one. In this packet you will discover techniques for using objects found in the Smithsonian Institution or in other museums to stimulate creative thinking. The material has been designed to help you, the teacher, encourage the discovery of new insights, new paths, and new imaginings.

These suggested activities will call forth children's spirit of adventure by presenting problems as opportunities. By developing and strengthening creativity through exercises and practices, you will help your students increase their knowledge and use what they learn in a meaningful way. At the same time, the materials will call upon your own creativity because the models introduced can be expanded and new exercises can be formulated.

Test Your Creativity

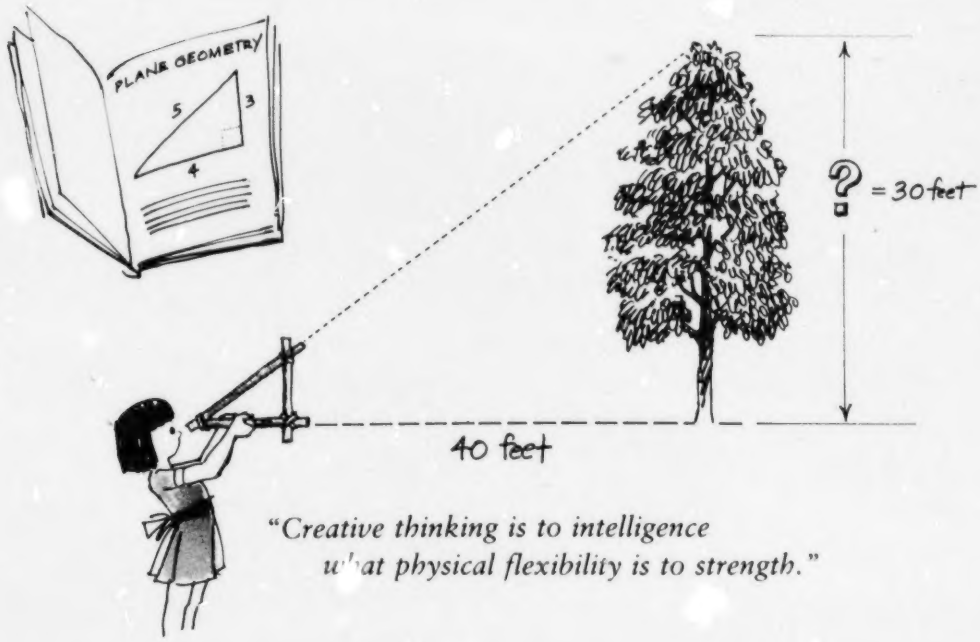
Young children have an almost insatiable appetite to know "why" and to challenge the assumptions of the adult world. They also have the flexibility to see things in new ways and from unique vantage points. They are constantly learning new facts, processing information, and drawing new conclusions. There are many parallels between creative thinking and the stages of early childhood development.

As we grow up, however, our expectations and lack of openness to new information can interfere with the learning process. We see things as we assume them to be. This approach often blocks us from viewing them as they are, or as they could be. For example, can you discover the order of each of these columns of numbers?

2	4	8
4	7	11
6	6	5
8	9	19
10	8	7
12	11	6
14	10	12
16	13	0

If you had difficulty understanding the sequence of the third column, perhaps you were assuming that numerical order would determine the arrangement of all three columns. In fact, the third column is in *alphabetical* order. By being tied to our expectations we can become less effective problem solvers.

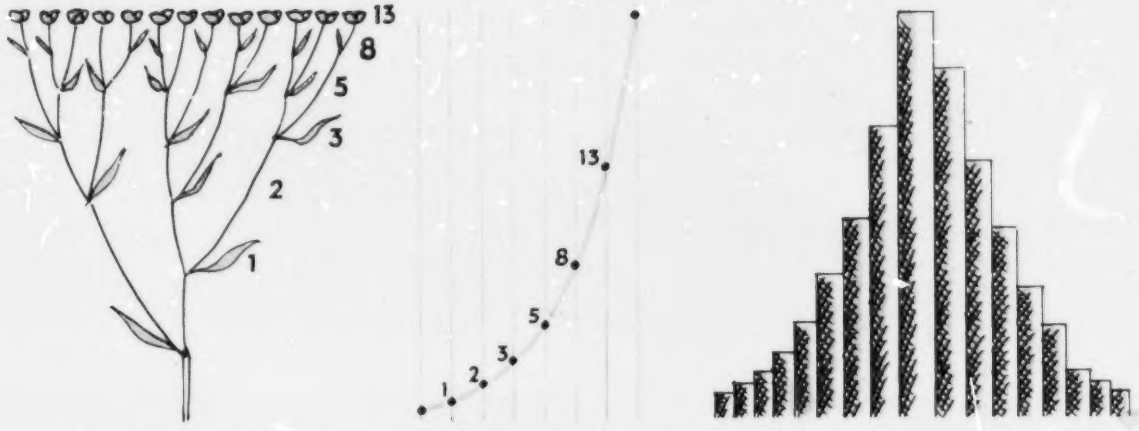
Does this imply that creative thinking and intelligence are one and the same? While there are correlations, no direct relationships have been proved. Highly intelligent people can be very rigid thinkers. They may be completely stumped when asked to develop an original concept. Creative thinking is to intelligence what physical flexibility is to strength. While each can exist independently of the other, their potential is greatest when the two are working together.



"Creative thinking is to intelligence what physical flexibility is to strength."

Design a Creative Environment

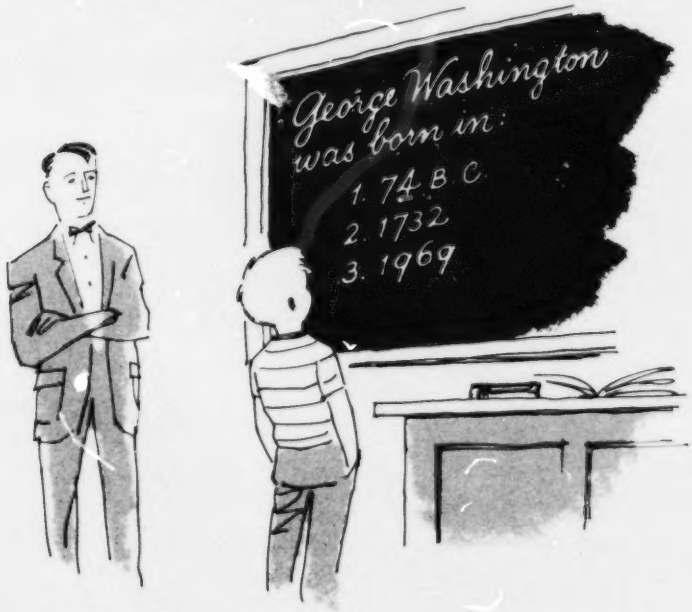
Due to many constraints placed upon teachers today, by necessity, and sometimes by design, most classroom activities are planned with test scores in mind. Often this is accomplished through a highly structured framework. Science takes place during science period and not during music or art. Yet, in the world beyond the classroom walls, the principles of science are often creatively applied to music and art, through the medium of television or in such fields as acoustics or photography.



"The principles of science . . . [through mathematics] . . . to music"

A creative observer, Fibonacci, saw the pattern of natural growth as a series which was close to the kind of exponential curve that can be applied to the construction of pipe organs, guitars, pianos, etc.

Many of the problems placed before a class are of the *convergent* type. That is, they pose questions that have just one answer or a finite set of correct answers. These are problems that often are used to test a student's recall of certain facts or the literal comprehension of the information presented. "What city is the capital of Idaho?" and "Is this statement true or false?" and "How many inches are there in a meter?" are examples of convergent questions. They are valuable to you, the teacher, because they let you know if certain basic information is being



"Many . . . problems . . . are of the convergent type."

learned. However, just because a student is able to answer these questions does not mean that he or she understands the significance of the information or will be able to use the information in another context.

Students should have opportunities to realize that using knowledge is just as important as acquiring it. When they learn what they can *do* with information they can begin to appreciate the value of their own minds as resources for stimuli and expression. This requires providing students with *divergent* opportunities and problems, as well as convergent ones.

Divergent problems are expansive. They allow for a variety of responses, as they have no fixed answers. They pose such questions as: "What criteria would you use to select a city to become the state capital?" and "How would you devise your own system of measurement?"

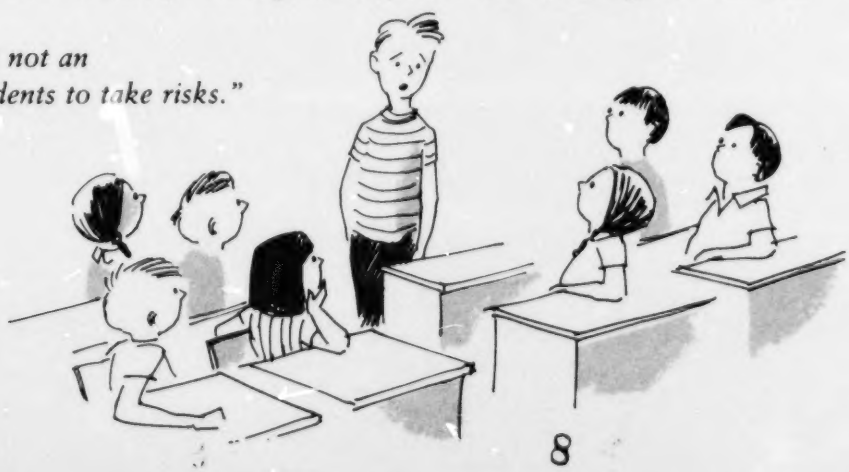
Because divergent activities can be difficult to manage, in general they are used by teachers less often than convergent ones. By their very nature, divergent questions can lead almost anywhere, irrespective of the "artificial" boundaries of classroom subject areas. In addition, such questions require a willingness to see things from another's point-of-view, and to make allowances for what is not understood. But difficult as they may be, divergent activities are essential to the development of creative and independent thinking in *all* students, regardless of their IQ's.

Cultivate Risk-Taking

Creating the proper environment for creative thought requires more than just allowing for it, or attempting to stimulate it through the use of divergent activities. Because the climate of the classroom is charged with pressures and expectations, it is not an easy place for students to take risks. The teacher's grade book and peer pressures do little to promote freedom of thought and expression; rather they tend to demand conformity. Therefore, the environment which encourages creativity must be cultivated; understanding must be developed among students, and between teacher and students, that there are times when "free thinking" is appropriate and to be encouraged. Then gradually, trust will develop and creative productivity will follow.

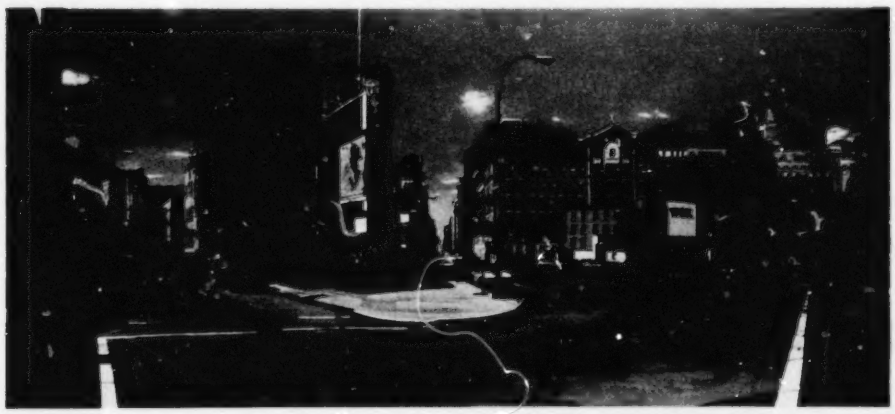
How can you make your classroom more creative? According to Dr. Paul Torrance, a leading authority on creative thinking, the creative

"The classroom . . . is not an easy place for students to take risks."



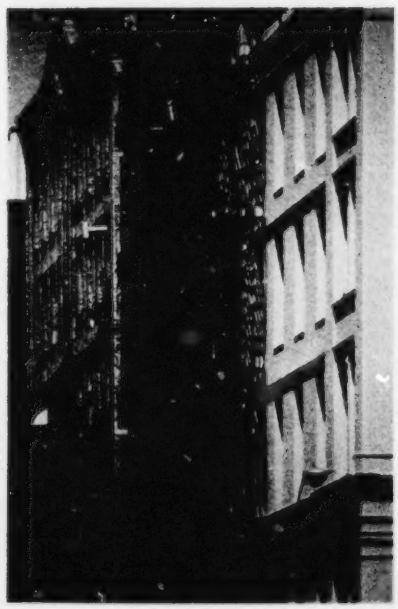
climate fosters an openness and respect for unusual questions and ideas, an understanding that all ideas have value, and an opportunity to learn and perform without constant threat of evaluation.

Respect for the unfamiliar and the unusual requires tolerance and sensitivity, two ingredients essential for creativity. Exposure to the unfamiliar and unusual shows us what we have never seen or noticed. This new perspective points out alternatives and allows us to see the world, and ourselves, in new ways. Also, from these new vantage points we can reexamine the anticipated and commonplace. Visual artists often use their unique perspectives and unusual perceptions to challenge our assumptions of the familiar. For example, look at these three versions of a New York City scene. Consider how each tells us something different and alters our usual idea of a city.



ESTES, Richard
Waverly Place, 1980
Hirshhorn Museum and Sculpture Garden,
Smithsonian Institution
photo by Lee Stalsworth

MURPHY, Catherine
View of World Trade Center from
Rose Garden, 1976
Hirshhorn Museum and Sculpture Garden,
Smithsonian Institution



HAN, Hsiang-ning
Soho—West Broadway, 1973
Hirshhorn Museum and Sculpture Garden,
Smithsonian Institution
photo by John Tennant

An idea, whether it is practical or visionary, is a precious commodity. The inappropriate idea of today could be the appropriate answer of tomorrow. Do we now see as "wild" dreams, Leonardo da Vinci's vision of air travel or Jules Verne's descriptions of underwater travel and trips to the moon? These ideas, though far ahead of the technological understandings of their day, are today's realities. Sometimes, having a quantity of ideas from which to choose is important because it makes the best solution to a problem more apparent. Also, one idea tends to lead to another. A seemingly irrelevant notion can be the spark that ignites thoughts of a better idea. For example, scientists who studied the flight of bats stimulated the development of sonar navigation.

For students, having ideas and sharing them with the teacher and class is a great risk. It requires continuous encouragement. However, developing and sharing ideas, and appreciating their inherent potential, is what creative thinking is all about.

Have you ever tried to do something while someone with a "critical eye" followed your every move? If so, then you can understand how this kind of scrutiny can inhibit the creative process. In order to create, you need to be allowed to try, falter, select a new route, and try again. The fear of constant evaluation can damage this process. A teacher's scrutiny can force students to take only the "safest" route to a solution, allowing for little personal experimentation and growth. Or, it may convince students that the value of their creative abilities is determined by how others view them, discounting the worth of the personal rewards that the creative process often brings.

Like all class activities, answers to divergent problems eventually must be evaluated. But care should be taken to do such assessing at the appropriate time, and with the appropriate variables. The degree to which a student challenges *himself* or *herself,* and the level of mental activity brought to bear should be the most important criteria for evaluation. It is useful to remember that if all creative endeavors were judged solely on the basis of their successful outcome, most scientific and medical research would cease, as would experimental work in other fields.

Explore with Museum Objects

Though creative responses to divergent activities are individualized and highly subjective, the activities themselves can have boundaries which give the teacher control. What this means initially is that you should carefully select the problem to be explored. It will be useful and easier for you, the teacher, if everyone in the class is working from the same point of departure. And since the creative process is essentially abstractive, requiring conjectures about possibilities and consequences, you will find it best to begin with something concrete and tangible, such as an object.

3 BOARD PULLS CORD
4 CORD PULLS ON PITCHER, WHICH TIPS FORWARD, POURING MILK INTO SAUCER
2 CAT FALLS BACK, TIPPING BOARD
1 PICTURE OF DOG FRIGHTENS CAT
SELF-FEEDER FOR CAT

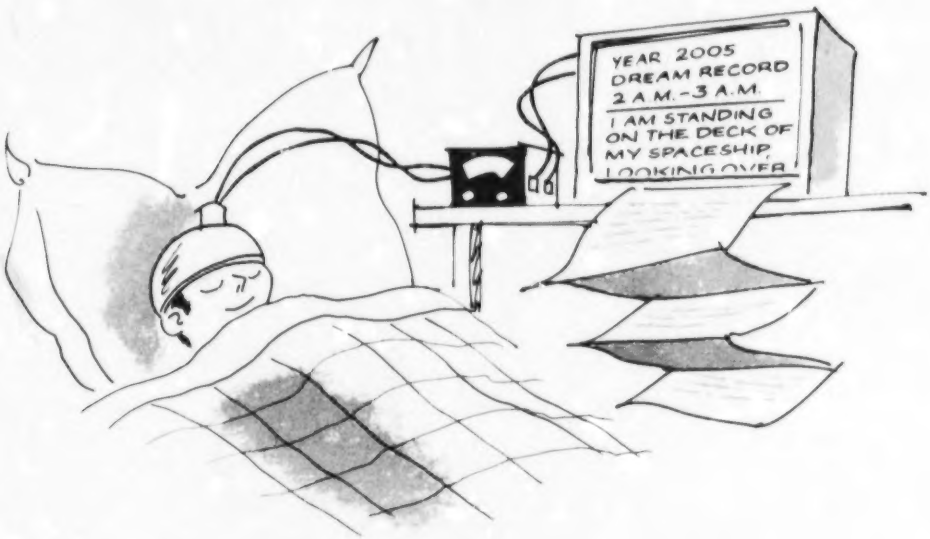
"An idea, practical or visionary is a precious commodity."

But what kind of objects are best suited for divergent activities? Almost any object can be used—an ordinary light bulb or chair or something more exotic, such as an African tribal mask or George Washington's false teeth (both of which are on exhibit at the Smithsonian Institution). A concrete object can be inspected and reexamined, and students can return to it again and again for inspiration. Objects also aid in the evaluative process, as students can use the object to help explain how they derive their personalized responses, if others find it difficult to see the connection.

Slides and/or reproductions, like those found in the activities section of this packet, may serve as substitutes when the actual object is not available for classroom use. You may, however, choose to take your class to see the real thing. Viewing the real object in a museum, seeing its actual size, shapes, colors, and details not only makes for a productive field trip, it has the added benefit of extending learning and creative thinking beyond the walls of the classroom. For example, all of the

objects referred to in this packet can be found at the Smithsonian Institution.

Your local museum can offer a world of resources, too. Objects in nearby museums, like those at the Smithsonian, are always special and authentic. They usually are chosen for display because of the many stories they tell, the information they convey, and the many ideas they suggest. Museum artifacts, specimens, and works of art are among the very best and most exciting objects to use as springboards to creative thinking.



"Original thinking . . . produces unusual . . . ideas."

Challenge Their Creativity

As we mentioned earlier, creativity is not one single form of thinking. There are several kinds of thinking generally associated with creativity. Each of these may be independent of each other, or may exist in combination with the others. And each can be used by you to foster creativity in your students.

- *Fluent thinking* is the ability to produce a quantity of possibilities, ideas, or consequences. In encouraging this kind of thinking, you should make little distinction with regard to the realistic or practical qualities of ideas. Fluent thinking calls for a *quantity* of variables. You can stimulate this type of thinking through questions that ask "How many . . . can you think of?"

- *Flexible thinking* is the ability to view one thing, such as an object, a word, or an idea, in a number of different ways. It is the type of mental gymnastics we perform when tackling a crossword puzzle. It requires examining one particular thing over and over. To stimulate this type of thinking you might ask "What is another way that you could . . .?"

- *Original thinking* is the ability to produce unusual, unique, or highly personal responses or ideas. This is what we most commonly think of as "creativity." This type of thinking can be stimulated by questions that ask students to "Think of . . . in a way that you feel no one else but you might," or "Develop *your own* ideas about. . . ."

- *Elaborative thinking* is the ability to expand, develop, and embellish. Elaboration encourages more detailed thought. It also can reveal the logic behind thoughts which are, at first, difficult for others to fully understand. Elaboration promotes communication, which is important to the development of creativity. Questions such as "Can you tell me more about . . . ?" will stimulate this kind of thinking.

[Above adapted from—Felice A. Kaufmann, *Your Gifted Child and You.* (Reston, Virginia, 1976)]

Remember the Rules of the Game

The activities in this packet are designed to work through the levels of cognitive learning, and to inspire and encourage fluent, flexible, original, and elaborative thinking by your students. Use these activities with your class and as models to suggest other creative ways of approaching objects and the curriculum. And, as you incorporate our approaches into your teaching strategy, keep in mind the *rules of the game:*

- *All students can, and should, become more practiced creative thinkers.*

- *All ideas should be welcomed, without any form of discouragement, by the teacher or the class.*

- *Personal risk-taking and experimentation are goals of creative thinking, and should be encouraged.*

- *An experiment which fails, or an idea which is not practical, should* not *be considered as failing at creative thinking.*

- *Evaluation of performance should not be based solely on the "product" or answer, but should take into consideration the challenge attempted and the level of mental "stretching" involved.*

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